11 October 1954

MEMORANDUM FOR: Chief, TSS/TO

ATTENTION: Chief, APD

SUBJECT: Data for Project [redacted] Mean Temperatures at Indicated Levels

50X1

1. The attached graph indicates mean temperatures in degrees Centigrade for the approximated altitude levels of 10,000, 18,000 and 30,000 feet above the target. Standard deviations at these indicated levels are shown by arrows. The mean temperatures at these levels have been connected by a solid line between points. The standard deviation figures have been connected by a broken line between points. It is realized that 30,000 feet is well above presently considered altitude levels. It is included however, to show the temperature trend above 18,000 and because it was the next available level.

2. In order to save time standard average charts were used at the available millibar levels and estimates were taken from these instead of having a separate more detailed but slower, compilation. Only one month per season was charted (i.e. July for summer and October for fall). However, it is believed the attached data, with due attention to the standard deviations, will provide the necessary parameters, at this point in the project development. It is suggested that a minus 10 degrees centigrade be added to all standard deviations to allow for occasional extremes.

3. Please advise if further detail is needed concerning expected temperatures above the target.

[redacted]

50X1

Chief, SR/FI

Mean Temperatures at indicated levels above Target for July and October. Standard deviations shown by arrows.

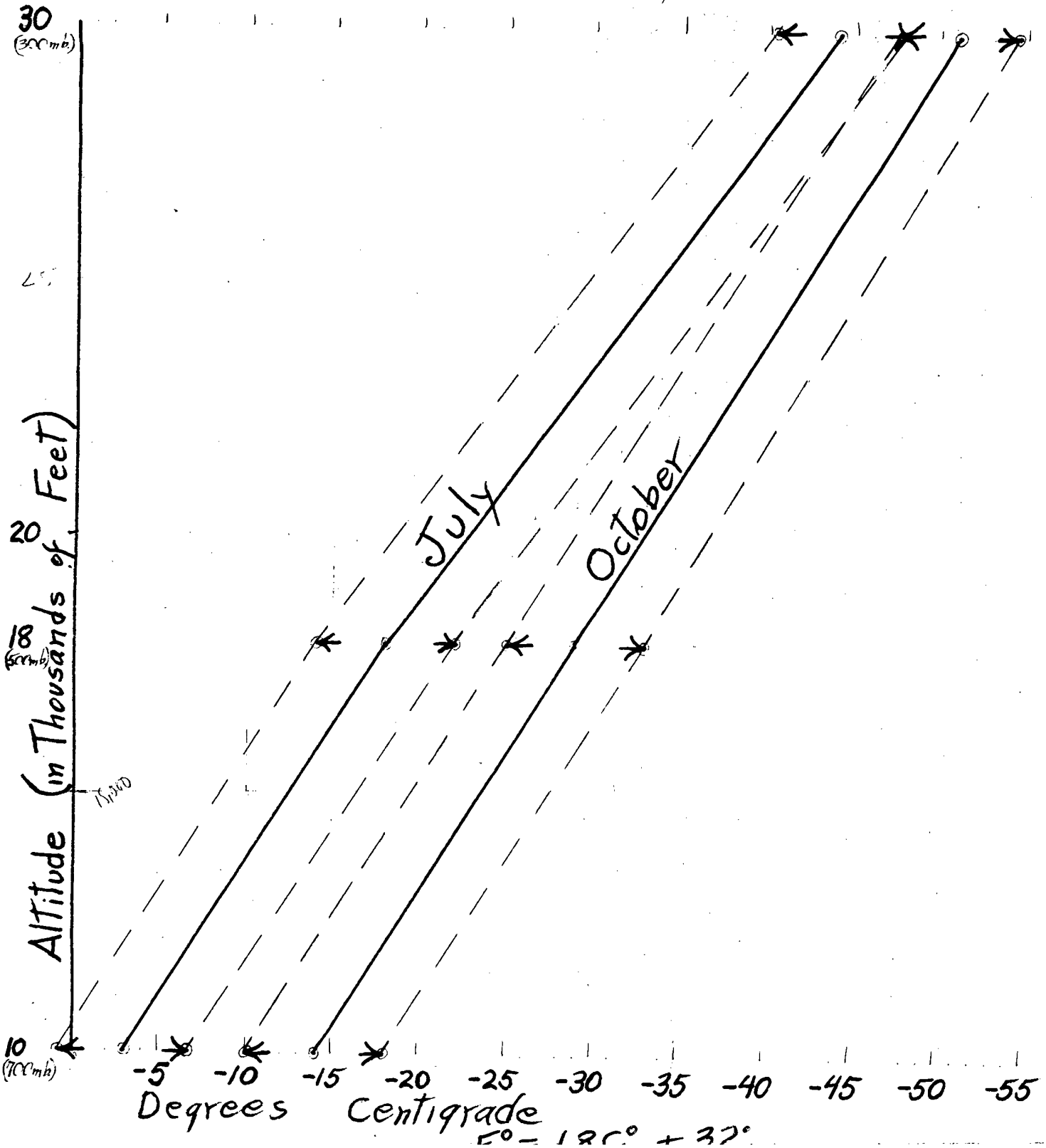

PHOTO INTELLIGENCE MEMORANDUM

50X1

GP/I-30
(Project 70.132)

20 September 1954

CENTRAL INTELLIGENCE AGENCY
Office of Research and Reports

S-E-C-R-E-T

Photo Intelligence Memorandum

[redacted]

50X1

GP/I-30
(Project 70.132)

20 September 1954

CENTRAL INTELLIGENCE AGENCY
Office of Research and Reports

S-E-C-R-E-T

50X1

Problem: To investigate and make recommendations for a suitable aerial camera or cameras to be used under specific conditions. Limiting factors involved are the following:

1. Two and one-half to three cubic feet of carrying space available for camera.
2. Maximum weight of 75 lbs.
3. To be operated without benefit of electricity or vacuum line.
4. One camera to function for both oblique and vertical exposures.
5. Operation in temperatures ranging from 0° F to -50°F.
6. The equipment should be capable of being made Government sterile.
7. Altitudes of 10,000 to 20,000 feet.

Discussion of the Limiting Factors:

1. Lack of electricity and vacuum lines restrict camera selection to only that equipment which may be manually operated.
2. The temperature and altitude at which camera use is contemplated necessitates arctic type clothing, heavy gloves and possibly oxygen equipment. This attire is cumbersome and limits severely the hand and arm manipulations the operator can execute. The recommended equipment must therefore be simple in its operation and have controls and grips suitable for use while attired as above.
3. The requirement for equipment capable of being made Government sterile eliminates all cameras used by the U. S. Government except those that have been lend leased or sold to foreign governments, or otherwise have gained world wide dissemination.

4. The basic limitation to a maximum weight of 75 lbs. coupled with the need for the camera to do both vertical and oblique photography places a demand for a light camera. If this camera is to be used for any considerable period of time, particularly if the user is heavily clothed and "on" oxygen, the camera weight must be much less than 75 lbs. and must be well "balanced" to avoid excessive photographer fatigue.

5. Based on the proposed altitudes at which the photography is to be exposed the negative size should be no smaller than 4" x 5" and if possible, larger.

Camera Considerations:

1. The foregoing requirements eliminate all aerial cameras with the exception of the K-20 and the F-56. Both cameras are manually operated and have been lend leased and sold on the war surplus market.

2. The F-56 is available in several lens configurations, with the 8" lens having the shortest focal length. It has a 7" x 7" negative size, using roll film in 200 ft. lengths. The camera weighs approximately 45 lbs. loaded with the 8" cone, and is approximately $1\frac{1}{2}$ cubic feet in size ($1 \times 1 \times 1\frac{1}{2}$). Manipulation is simple, but the weight and manner of manipulation would quickly tire the user. Since the size of the proposed "target" is not known it becomes a matter of question if the eight-inch lens would give optimum cover. Should the target be small in area, a much longer lens than the normal 8" would be desirable, while the 8" lens would be desirable if the target was of large size. In addition it would be desirable to be able to cover not only individual targets but also large areas plus targets of opportunity to considerable oblique ranges. It becomes apparent therefore that the best solution to the requester's problem lies in using more than one camera or in a series of interchangeable lenses of different focal lengths. Weight and space factors eliminate this solution if the F-56 camera is used.

3. The K-20 camera has received world wide distribution both via lend lease and war surplus outlets. The camera is approximately 3/4 cubic foot, and weighs roughly 8 lbs. loaded with a 50-exposure roll of daylight-loaded 4" x 5" film. It is normally assembled with a $6\frac{1}{2}$ f4.5

lens but has been adapted to a 16" lens as well. Camera manipulation is easy and simple except that the film advance and shutter cocking handle might need some modification for use with gloved hands.

Recommendations:

1. In view of the preceding statements, use of 2 K-20 cameras is recommended as insurance against camera malfunction. Both of these should be modified to accept a series of easily interchanged lenses of $6\frac{1}{2}$", 12", and 24" focal length. This choice of lenses will allow the operator to obtain pictures at varying scales and will assure better photographic coverage of targets and areas of differing sizes.

2. It is further suggested that Kodak Aerial Super XX film (mapping base) be used in conjunction with a Kodak "Minus Blue" filter. The film should be exposed at shutter speeds and lens stops that will give a slight under exposure in order that negative grain will be kept at a minimum. If it becomes apparent that the cameras are to be exposed to extreme low temperatures consideration should be given to an insulating jacket for the film housing. Such a jacket could be readily warmed through the use of "pocket hand warmers" that are available in any sporting goods store.

European?